

## COMPOST ANALYSIS

A testing programme specifically devised for analysing composts for their nutrient content is available. Additional tests relevant to their usage in organic growing are also offered.

### What is compost?

There is some confusion regarding exactly what is a compost. Soil-less growing media are sometimes referred to as composts, as are organic fertilisers and soil conditioners.

Table 1 lists some common descriptive terms, components and usages of composts and related materials likely to be encountered.

When describing a material, it is important to establish (i) whether the sample will be used directly as a complete growing media for the plants to grow in or (ii) whether it is to be added to a soil as a mulch or soil amendment.

In the first case, the sample is a growing media and the plant available nutrients are of most interest. (Water Extractables B profile).

At Hill Labs, materials other than growing media will be regarded as composts.

Note: Raw manures are not accepted by the laboratory.

| Common terms   | Likely components                        | Final purpose                    |
|--|--|----------------------------------|
| Growing media  | Bark, sawdust, peat, pumice              | Growing plants                   |
| Compost<br>Mulch<br>Soil amendment<br>Soil conditioner | Plant material, bark, sawdust, vermicast | Amendment of soil organic matter |

**Table 1:** Common Terms Relating To Compost

### Summary of tests

The most commonly asked questions about composts are 'What's in it?', or, 'Can I use it as an organic fertiliser?' We have established a series of test profiles that are useful to evaluate compost quality.

The tests most appropriate for your sample will depend on knowing the origin of the material and how the compost is to be used.

Table 2 lists the recommended profiles and their prices.

| Profile Name                     | Profile code | Tests required   | Price |
|----------------------------------|--------------|--|-------|
| Basic Compost <sup>1</sup>       | BC           | Dry Matter, N, P, K, S, Ca, Mg, Na, Fe, Mn, Zn, Cu, B, OM, C:N Ratio                         | \$126 |
| Complete Compost <sup>1</sup>    | CC           | Dry Matter, N, P, K, S, Ca, Mg, Na, Fe, Mn, Zn, Cu, B, OM, C:N Ratio, Cd, Cr, Pb, Ni, Hg, As | \$204 |
| Standard Compost Profile         | StdComp      | BC + WEB   | \$200 |
| C N Ratio                        | CN           | Dry Matter, C, N, C:N Ratio  | \$81  |
| Heavy metals                     | HC           | Cd, Cr, Pb, Ni, Hg, Zn, Cu, As   | \$97  |
| Pesticides screen                | Multires     | Multi-residue (>180 compounds)   | \$322 |
| Acid herbicide screen            | Acidherb     | 2,4-D, 2,4 5-T, Triclopyr etc  | \$310 |
| Water Extractable A <sup>2</sup> | WEA          | pH, EC   | \$40  |
| Water Extractable B <sup>2</sup> | WEB          | pH, EC, NO <sub>3</sub> -N, NH <sub>4</sub> -N, P, S, K, Ca, Mg, Na                          | \$74  |
| <b>Additional Test:</b>          | LOI          | Loss on Ignition (Organic Matter)  | \$28  |

1. Elements in the Basic and Complete Compost profiles are analysed as “totals” and reported on a dry weight basis.

2. Elements in the Water Extractable profiles provide a “plant available” measure and are reported on a fresh weight basis.

These prices are NZD (\$), exclude GST and may be subject to change. For pesticide and herbicide residue testing it is recommended that a quote is requested to ensure test requirements are met.

## Basic Compost Profile

The Basic compost profile consists of the following tests:

- Dry Matter**  
 Composts can vary greatly in their moisture content. The moisture effectively dilutes the nutrients in the sample. For this reason, we believe the dry matter content of the sample should be reported. The nutrient levels can be converted from a dry matter basis to an ‘as received’ basis using this result.
- Nutrients**  
 The levels of plant essential nutrients are important to assess the compost’s value. The Basic Compost profile now includes the major elements (N, P, K, S, Mg, Ca, Na) and the trace elements (Fe, Mn, Zn, Cu, Fe, B).
- Organic Matter**  
 The organic matter in the compost may improve soil condition and structure. It will also act as an indicator to distinguish between composts and inorganic fertilisers. The degree to which the material is definitely organic in nature is also important to some clients.
- C/N Ratio**  
 This ratio can be useful to assess the nitrogen supplying potential of the compost. In undecomposed organic matter the amount of carbon is relatively high, and as it decomposes much of this is lost to the atmosphere as carbon dioxide. In this process, nitrogen is consumed by microbes breaking down the organic carbon. A high C/N ratio usually means that very little nitrogen is available to the crop, because of this microbial competition.  
 For growers relying on their nitrogen source being provided from the recycling of organic materials, this ratio can be used to judge whether the compost is likely to supply nitrogen, or in extreme cases, consume it in the breakdown of the material.

## Loss on Ignition

A loss on ignition test is also available, providing a better measure of organic matter (OM) than the OM test as calculated from the total carbon (tC) test. The relationship between carbon and organic matter varies according to the type of organic matter and soil type (if soil present in the compost) so the result obtained using the tC equation may be either an under- or over-estimation of the actual OM.

## Complete Compost Profile

This profile is an extension of the Basic Compost Profile and includes the heavy metals Cd, Cr, Pb, Ni, Hg, As

## Heavy Metals Profile

Some composts and soil amendments may contain elevated levels of heavy metals, due to the source of some of their constituents. These metals may subsequently accumulate in the crop being grown. The levels of various heavy metals can be determined if required.

## Water Extractable Nutrients

Two water extractable nutrients profiles are offered. The pH will indicate whether the material is acidic, neutral or alkaline. The presence of soluble salts, particularly inorganic nitrogen ions, is relevant in assessing whether or not the material complies with organic farming requirements.

## Pesticide Screen

The material can be analysed for the presence of a wide range of pesticides. Over 180 organo-nitrogen, organo-phosphorus and organo-chlorine compound are included in the standard test.

## Sampling Instructions

Your composts have been processed from a mixture of biomass and/or other components and are not totally uniform in composition. We suggest that you collect several small 'grab samples' from your bulk compost and combine these to give a composite sample of approximately one kilogram and store it in a stout, sealed plastic bag or container. Bags will be provided by us on request.

## Reporting Method

Test results for all total nutrients will be expressed on a dry matter basis, and can be recalculated to a fresh weight basis by the client using the dry matter result using the following formula:

$$\text{Results (as received)} = \text{result (dry matter basis)} \times \left( \frac{\text{Dry Matter}}{100} \right)$$

Note that reporting results on a dry matter basis is in contrast to the convention applying to fertilisers in general, where results are reported on an 'as received' basis.

## Reporting Units

% = g/100g = g analyte / 100g compost

mg/kg = ppm = mg analyte / kg compost

(to convert mg/kg (ppm) to %, multiply x 0.0001)

## Special Considerations

Please provide additional information about the sample, particularly the constituents used and whether they may constitute a health hazard. This will ensure our staff can take appropriate precautions when handling these samples. Some particularly difficult samples may require additional sample handling and consequently incur additional costs.

## Conclusion

Hill Labs is pleased to now offer a testing programme specifically for composts. By having established these routinely offered profiles we can provide a more relevant and effective service to our clients.

## References

Metson, A.J., 1971. *Methods of chemical analysis for soil survey samples*. Wellington, New Zealand DSIR. (Soil Bureau Bulletin 12).

Handreck, K and Black, N., 1989. *Growing media for ornamental plants & turf*. NSW University Press.

Australian Standard, 1997. *Composts, soil conditioners and mulches*. Standards Australia, AS4454-1997.

NZ Standard (NZS 4454:2005) Composts, soil conditioners & Mulches